

REMARKS

Claims 9-12 are pending in the present application, claim 10 having been withdrawn. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

Claims 9, 11 and 12 were rejected under 35 U.S.C. §103 as being unpatentable over Alden (PCT Publication WO2004/041541) in view of Welschlau (U.S. Patent 4,587,898) as evidence by Spann (U.S. Patent 6,491,361) and further in view of Lewis (U.S. Patent Publication No. 2004/01633562) and Pers (U.S. Patent No. 5,365,847). This rejection is respectfully traversed for the following reasons, and for the reasons set forth in the responses filed on December 4, 2007, and February 24, 2008, which are hereby incorporated by reference.

As noted in the Office Action, Alden discloses a method of applying a graphic design pattern to workpieces that are made of corrugated board, the board being a laminate material comprising two substantially parallel covering layers of paper material and a core of corrugated fibreboard placed between the covering layers, and at least one diffusion layer. Page 2, lines 24-27; page 3, lines 8-10. The graphics pattern is printed using an ink-jet printer, which is digitally controlled. Page 2, lines 27-28. After the graphic pattern is applied to the workpiece surface, the workpiece continues through the line to a laser cutter 5, which cuts a predefined shape from the workpiece. Page 2, line 29-page 3, line 2. The laser cutter puts cuts in the workpiece so that items with a two dimensional design are created, which are then assembled into a three-dimensional, self-locking and self-supporting construction. Thus, the corrugated board used by Alden is pre-fabricated.

Printing and cutting a pre-fabricated corrugated board does not constitute manufacture of corrugated board. For the manufacture of corrugated board, several webs of material are needed, at least one of which is corrugated in a fluting unit and subsequently united with at least another web of material to form a web of corrugated board. Alden does not relate to any of these steps, and thus, does not disclose a machine for manufacturing corrugated paper.

The Office Action acknowledges that Alden “does not disclose this process being part of in-line formation [of] the corrugated web.” Actually, the failures of disclosure in Alden of the claimed invention are more extensive than that. It does not teach or suggest a corrugated web at all; the workpieces 1 are precut corrugated board. Further, Alden does not recognize or discuss any shrinkage problems that can arise from the manufacturing process of sheets of corrugated board which are subject to heating and drying processes, or any suggestion of how to solve the negative effects that the shrinkage problems have on the printing process. Nor does it suggest scaling of the printed images to take into account that shrinking of the board.

The Office cites Welschlau as allegedly disclosing forming a corrugated board by printing on a continuous web, joining the web with a corrugated web, and cutting the formed corrugated product, citing Fig. 1, col. 6, lines 4-12). Applicant respectfully submits that Welschlau teaches using carrier bands on which the printing forms are secured, or which are made of printing forms. Col. 3, lines 9-17. Welschlau is concerned with the problems arising from non-alignment of the images when two images have to be superimposed on one another, and how to solve those problems using marks on the carrier

band. Col. 4, line 51-col. 5, line 30. Welschlau discloses cutting the corrugated paper web according to the printed-on laterally adjacent numbers of pattern repeats, and cutting the web transversely. Col. 6, lines 8-15. There is nothing in Welschlau that discusses problems associated with shrinkage of the paper forming the corrugated web, or the effect of that shrinkage on the printing process, or any solutions to those problems.

The Office asserts that it would have been obvious “to make the process of Alden inline wherein the corrugated board is formed and then printed and cut since Welschlau discloses forming and cutting a corrugated web in an inline process and since this would allow continuous formation of the product.” However, Applicant respectfully submits that to combine Welschlau and Alden in this way would not have been obvious without the impermissible hindsight reconstruction of Applicant’s claimed invention. Nothing in Alden discusses the need to form corrugated board in an inline process. Furthermore, Alden does not relate to printing on webs of material, which are continuous, *i.e.*, endless. Thus, as discussed in previous responses, Welschlau and Alden are from diverse arts, and one of ordinary skill in the art would not have been motivated to combine their teachings. Accordingly, one of ordinary skill in the art would not have been motivated to combine the teaching of Alden with any other cited prior art document.

Further, even if the ordinarily skilled artisan were to modify Alden to be an inline process, there is no teaching as to how one would use digital printing using an ink-jet printer in an inline process. The inline process of Welschlau uses carrier bands to print on the continuous web. The inline process of Welschlau would not work for its intended purpose, *i.e.*, to adjust the printing stations such that the printed pictures can be printed

upon the advancing paper web in proper relationship to one another and over one another by shifting the carrier bands relative to one another, were it to be used in a system in which there was shrinkage of the web material. See Declaration of Norbert Städele, dated December 3, 2007, paragraph 5 (hereinafter "Städele, ¶ 5"). If there was any shrinkage, the carrier bands with suitably scaled printing forms would also have to be continuously adjusted relative to each other along the direction of the width of the paper web to make printing the same picture several times in proper relationship to one another and over one another possible at all. Welschlau does not address this issue as he does not address the problem of shrinkage. Städele, ¶ 5. Thus, one of ordinary skill in the art would not have been motivated, when trying to solve problems due to shrinkage, to use the methods and systems taught by Welschlau. Accordingly, the disclosure by Welschlau does not lead a person skilled in the art to the invention according to claim 9, absent the impermissible use of hindsight reconstruction of Applicant's invention.

Furthermore, Welschlau does not disclose the use of a digital printing method. Only with a digital printing method in accordance with the present invention is it possible to flexibly scale a printing pattern with scaling factors, which are determined depending on a continuously monitored, varying degree of shrinkage of the corrugated web being produced. With conventional, previously known printing methods, such as rotary printing, printing forms have to be pre-fabricated rendering a continuous, flexible scaling impossible. In accord with the teachings with respect to conventional paper making machinery, Welschlau discloses the use of a rotary printing machine. Welschlau does not

teach any reason why one should replace a rotary printing machine by a digital printer.

Städeler, ¶ 5. On page 5 of the Office Action, the Examiner argues:

Examiner is using Welschlau to show it is known to form corrugated board and print on it, thus suggesting making the corrugated board in Alden and printing on it, not taking the process of Welschlau wholesale into Alden.

This argument is not understood. Alden already shows printing on a corrugated board. However, Alden takes a prefabricated board, already having its layers put together, and prints on it, then cuts it in such a way that it can be formed into a package. Applicant is not claiming printing on a corrugated board. Since Alden has nothing to do with manufacturing the corrugated web material, *i.e.*, Alden does not teach “providing a corrugating machine which comprises at least two unroll stands for unwinding continuous webs of material as well as at least one processing equipment for producing at least one web of corrugated board from the webs of material”, Alden does not meet this limitation of the claim. If the Examiner is cited Welschlau to teach this limitation, then the Examiner is indeed “taking the process of Welschlau wholesale into Alden.”

The Advisory Action argues that “...the primary reference is Alden, which is a digital printer. Examiner does not have to determine a reason to replace the rotary printer of Welschlau with a digital printer, since the primary reference, Alden, is a digital printer. Welschlau is used to suggest making the product of Alden in a continuous process as shown by Welschlau.” Applicant respectfully submit that the Examiner does have to provide a reason as to why one of ordinary skill in the art would modify Alden to use the teachings of Welschlau, which uses a rotary printing machine. Further, making the product of Alden, even in a continuous process as shown in Welschlau, does not yield Applicant’s claimed

invention, since as discussed above, Alden does not make a corrugated board – it makes a product **using** a corrugated board.

Applicant respectfully submits that Alden does not use a heater, so there is no shrinkage involved. Spann relates to a digital media cutter that produces pieces of printed media of a pre-defined shape. Thus, Alden and Spann do not address the issue of shrinkage and do not relate to a method of manufacturing corrugated board. Accordingly, they do not teach anything about determining and applying a scaling factor to a printing pattern to account for shrinkage. Städele, ¶ 6.

The Office Action cites Lewis as allegedly disclosing

Placing marks on the paper at an upstream location and measuring their spacing at a downstream location to determine the amount of shrinkage or web growth in two dimensions ([0093],[0289]) indicating the presence of marks in both dimensions. The reference discloses measuring the distance between a hole and a mark and correcting so that the correct position is maintained between the hole and the mark. [0143]

None of the newly cited documents discloses a method for the manufacture of corrugated board, either. Lewis Jr. et does not disclose a method for the manufacture of corrugated board. In fact, Lewis does not teach the determination of a degree of shrinkage. In particular, Lewis does not teach the determination of scaling factors for printing patterns or, indeed, *digitally* printing the printing pattern on at least one web of material on the corrugating machine in accordance with the determined scaling factors according to the pending claims 9 and 12. Instead, Lewis concerns a method to determine and correct registration errors, *i.e.*, adjusting the position in space of an object to be printed on with respect to a number of subsequent printing stations, wherein a printing station is “a set of

cylinders on a printing press that deposits one color of ink" (see [0264]). As the teaching by Lewis explicitly states that the printers are cylindrical printing presses, it is clear that neither does Lewis disclose a digital printing method, nor a scaling of printing patterns, which is impossible with such roller printers. Because Lewis does not disclose a digital printing method, nor a scaling of printing patterns, Lewis cannot and does not lead one of ordinary skill in the art to modify Alden and/or Welschlau to determine the shrinkage of the corrugated board, as asserted in the Office Action.

The Examiner acknowledges on page 3, of the March 28, 2008, Office Action, that Lewis does not disclose the determination of scaling factors for a printing pattern [*"the reference does not disclose specifically how this correction takes place"*]. To overcome this shortcoming of Lewis, the Office Action cites Pers as allegedly disclosing scaling. However, as the Office Action also points out, *"does not explicitly state the printed image is altered by scaling"*. The Action continues, stating:

One in the art would appreciate that since the reference is disclosing the expansion of the web and the desire of all the print colors to align, the modification to the printed image is a scaling of the image.

The method disclosed by Pers relates to modifying a printing image on printing cylinders *"in order to obtain proper registration between the printing cylinders"* (column 5, lines 9 to 10). Thus, just as Lewis, Pers concerns a method to control for misregistration of printing patterns printed by subsequent roller printers. Pers does not concern scaling of printing patterns to control for the shrinkage of a web of corrugated board during its manufacture, so that the desired size of the printing patterns will appear on the web.

Pers does not disclose the determination of a degree of shrinkage, let alone a scaling of a printing pattern in two directions. Again, since Pers discloses a printing method using cylindrical printing rolls, too, a scaling of a printing pattern in two directions is not possible with the method according to Pers.

Further, Applicant respectfully submits that having the print colors align in Pers has nothing to do with scaling. As in Welschlau, Pers involves the correction of registration errors between printed objects and mechanically product objects. The correction of registration errors involved the movement of the register motors so that all stations are within tolerance for the automatic final register system to operate. Para. [0547]-[00548]. It appears as though the Examiner is arguing that it is inherent in Pers that the modification to the printed image inherent must be a scaling of the image. However, it is well established that for a teaching to be inherent in a reference, that teaching must always and necessarily be true. In other words, if scaling were the absolute only way to accomplish the modification to the printed image to correct for registration errors, then one could say that scaling was inherent. But that is not the case. In fact, Pers itself teaches correction of registration errors by movement of the motors. Thus, it is not the case that scaling is the only way that such correction is made, and thus, the modification to the printed image is not, and need not be a scaling of the image.

In sum, Applicant's invention involves changing the size of the printed pattern, digitally printing the altered pattern on the web of material, and then cutting the printed web of material into the correct size and shape. As indicated on page 2 of the specification, "the gist of the invention resides in digitally imprinting the webs during

manufacture of the corrugated board, even before the sheets are cut to size, in a corrugating machine.” In accordance with Applicant’s claimed invention, the digital printing of patterns on the web takes place after the scaling factors to account for shrinkage have been determined (“digitally printing the printing pattern . . . ***in accordance with the determined scaling factors***”), and the sheets are cut thereafter from the printed web of corrugated board (“cutting the sheets . . . ***from the digitally printed web*** . . . in accordance with the shape and size of the digitally imprinted patterns.”). None of the cited art, whether taken alone or in combination, teaches a method of manufacturing corrugated board so that this feature is achieved.

Applicant respectfully submits that not even a combination of all five documents of the prior art cited by the Examiner, would lead to the subject matter recited in claim 9. Thus, claim 9 is patentable over Aldén in view of Welschlau as evidenced by Spann, and further in view of Lewis and Pers.

Claim 11 depends from and includes the limitations of claim 9, and is believed to be patentable in and of itself and for the reasons discussed above with respect to claim 9. Claim 12 is believed to be patentable at least for the reasons discussed above with respect to claim 9.

In view of the above amendment and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections of record. Applicant submits that the application is in condition for allowance and early notice to the effect is most earnestly solicited.

Appln. No.10/805,337
Amdt. dated June 23, 2008
Reply to Office Action of March 28, 2008

If the Examiner has any questions, he is invited to contact the undersigned at
202-628-5197.

Respectfully submitted,

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